SAFETY OF AQUAFLOR® ADMINISTERED IN FEED TO CHANNEL CATFISH *Ictalurus punctatus*.

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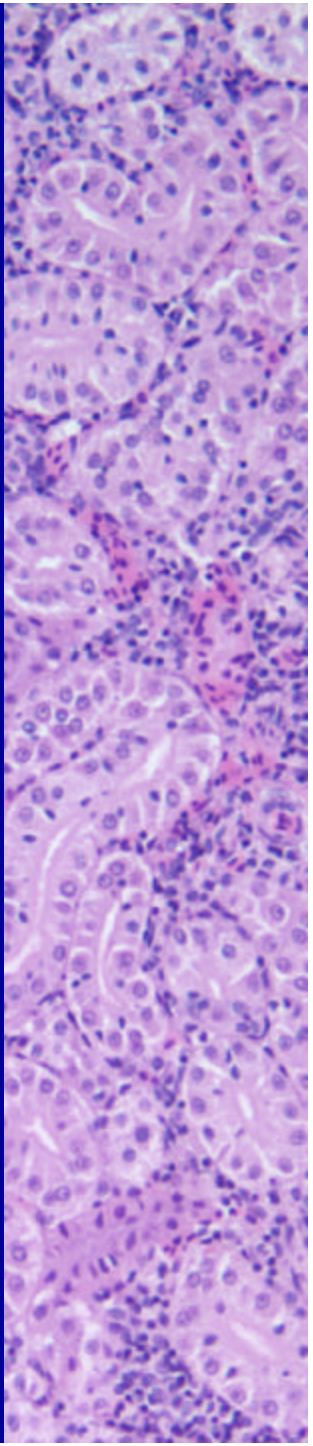
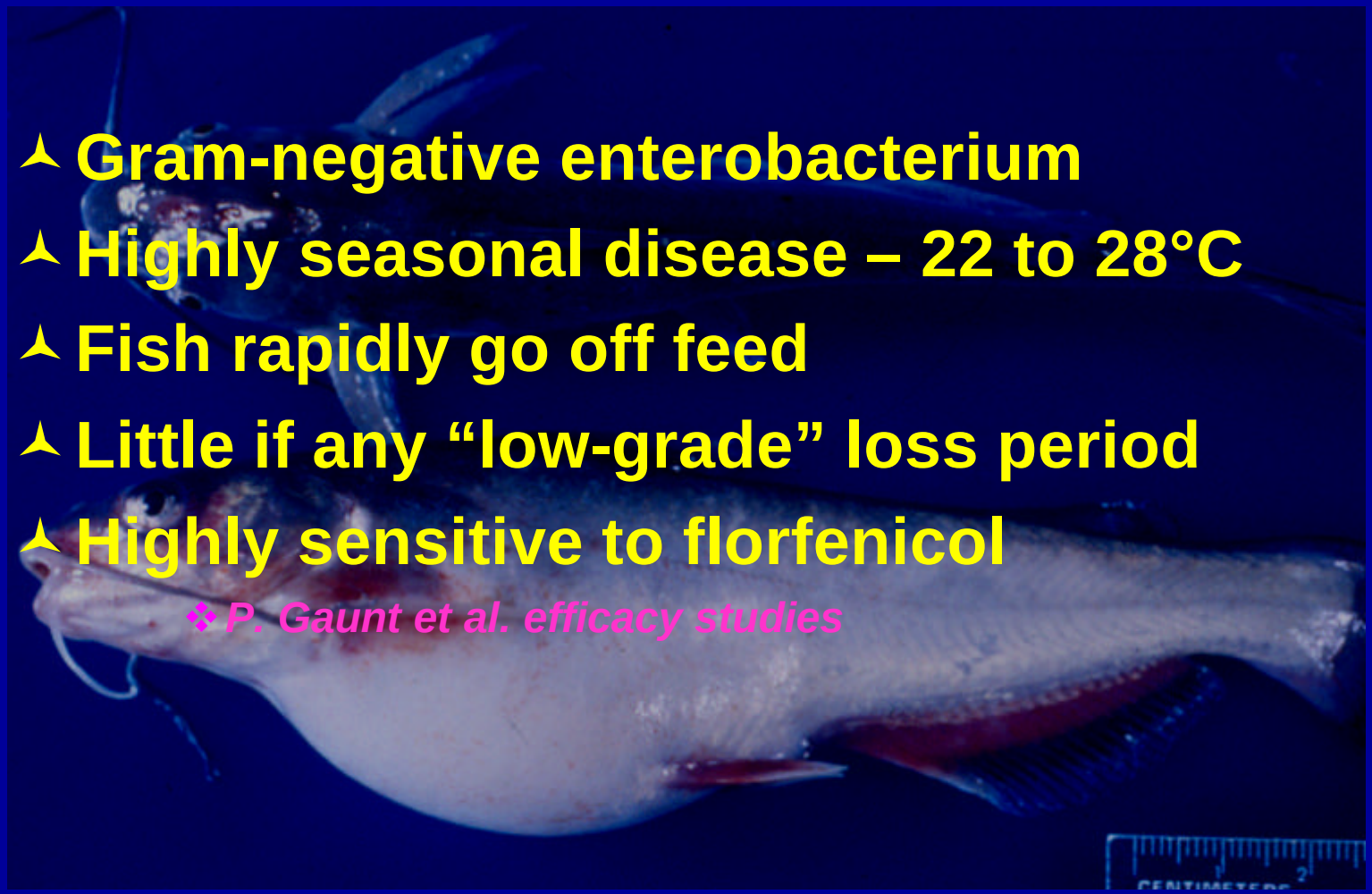
U.S. Channel Catfish Industry

- *Fifth most popular food fish in U.S.*
- *Catfish* ≈ 2/3 total US aquaculture
- Primary catfish states
  - Alabama, Arkansas, Louisiana, and Mississippi (~95%)
  - Mississippi accounts for ~70%
- *$4 billion economic impact*

Source: Thad Cochran National Warmwater Aquaculture Center, Fact Sheet 005



Enteric septicemia – *Edwardsiella ictaluri*



- Gram-negative enterobacterium
- Highly seasonal disease – 22 to 28°C
- Fish rapidly go off feed
- Little if any “low-grade” loss period
- Highly sensitive to florfenicol
  - *P. Gaunt et al. efficacy studies*

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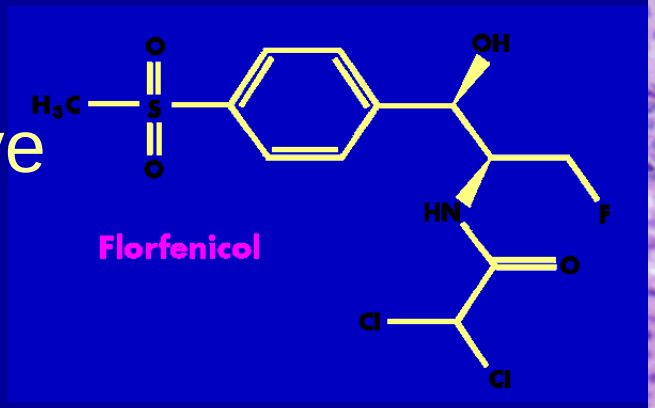
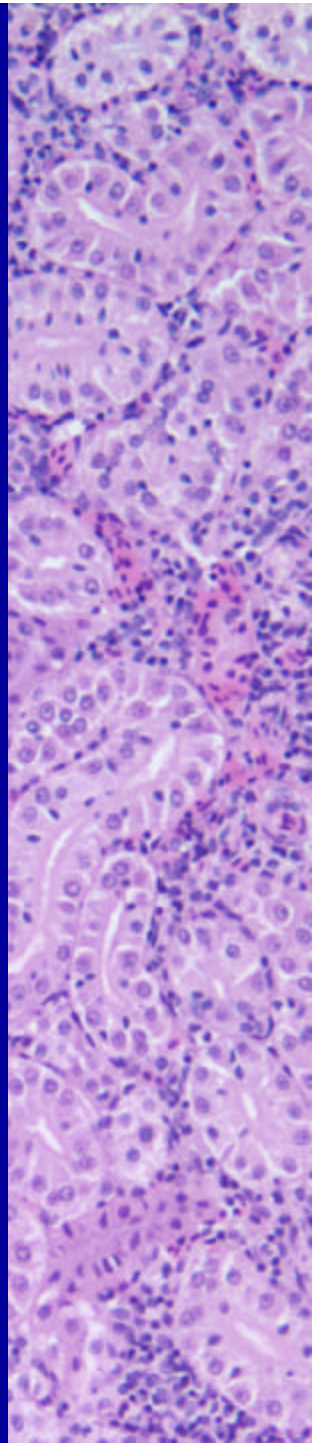
Safety of Aquaflor®



- monofluorinated derivative of thiamphenicol
- 50% florfenicol premix
- Recommended dose: 10 mg/kg BW/d for 10 d
- No pathologies in Atlantic salmon at 10X dose
  - (100 mg/kg BW/d for 10d)
- commercially available in:
  - Norway, South Korea, the Faeroe Islands, Chile, the United Kingdom, Japan, and Canada.

Methods

- *Feed – Delta Western 35% Fry II crumble (~3 mm pellet)*
- *Four feed levels*
  - *0, 0.5, 1.5, and 2.5 g/kg*
- *Nominal doses*
  - *0, 10, 30, and 50 mg/kg bodyweight/day when fed at 2% bodyweight*



Feed preparation

Florfenicol was incorporated into the feed through a *proprietary process.*

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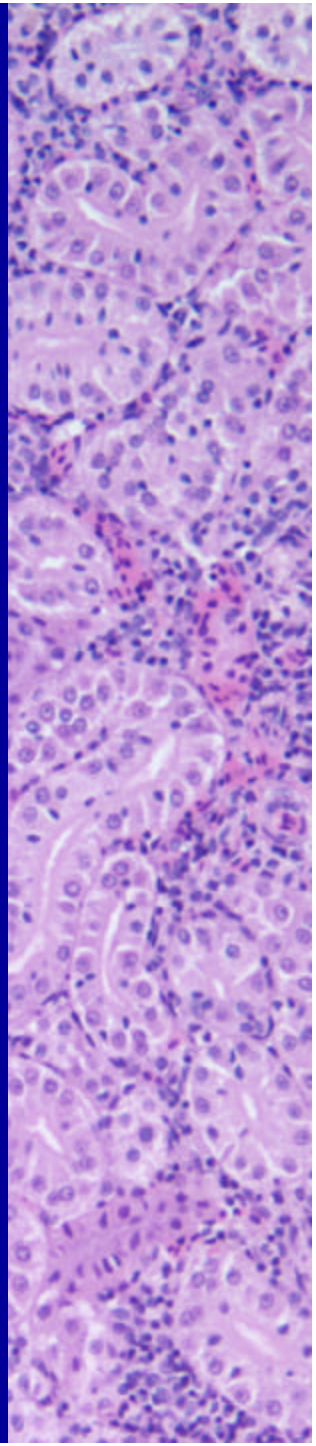
Study Design

- *Randomized Block with Blinding*
  - *Twelve test tanks in three blocks of four with one dose level per block*
  - *Twenty fish per tank*
  - *Technicians unaware of dose assignment*
- *14 day test tank acclimation period*
  - *Fish had been on control feed for ~2 mo.*
- *Dosed for 20 days*
  - *Uneaten feed collected daily, ~60 min after feeding, used to estimate dose*
- *Feed concentration confirmed by HPLC before and after dosing*



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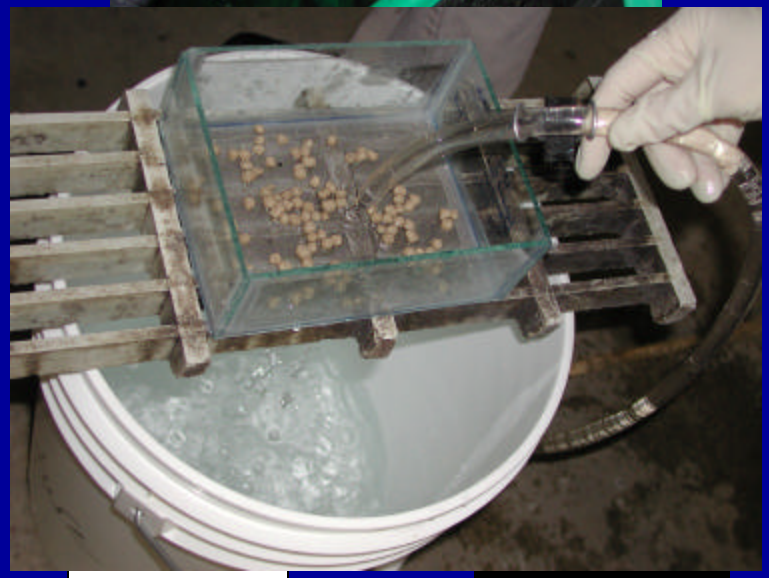

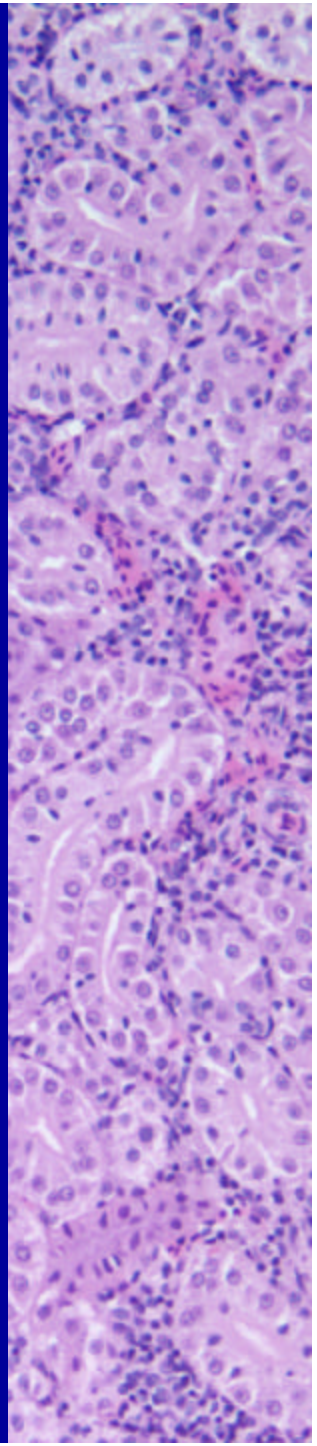

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Terminal Sampling

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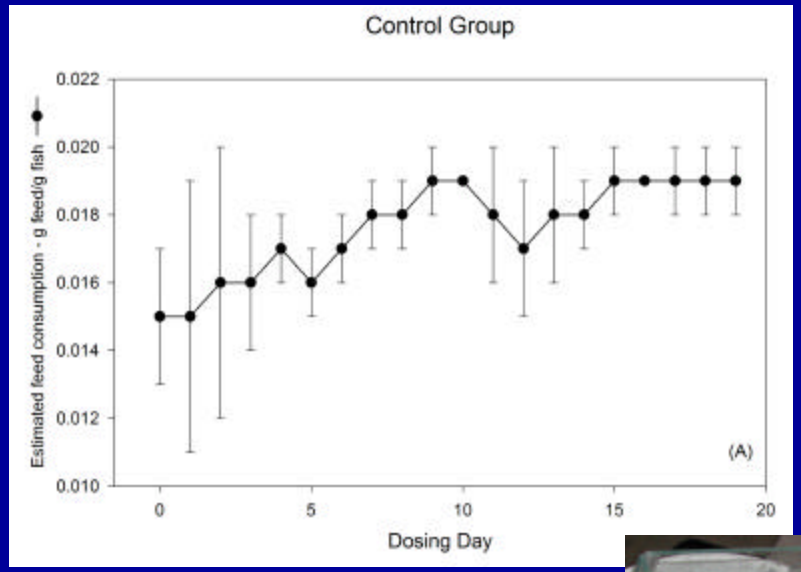

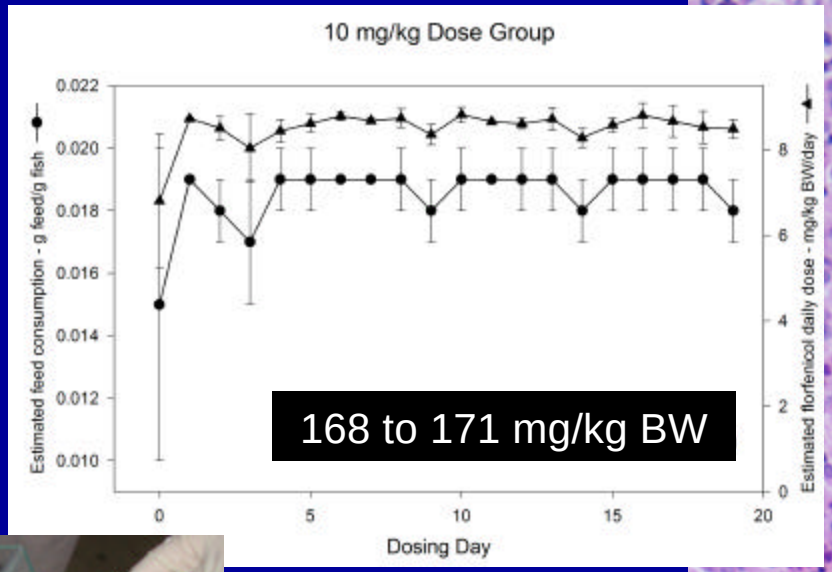

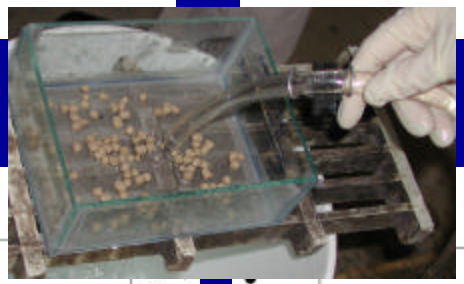

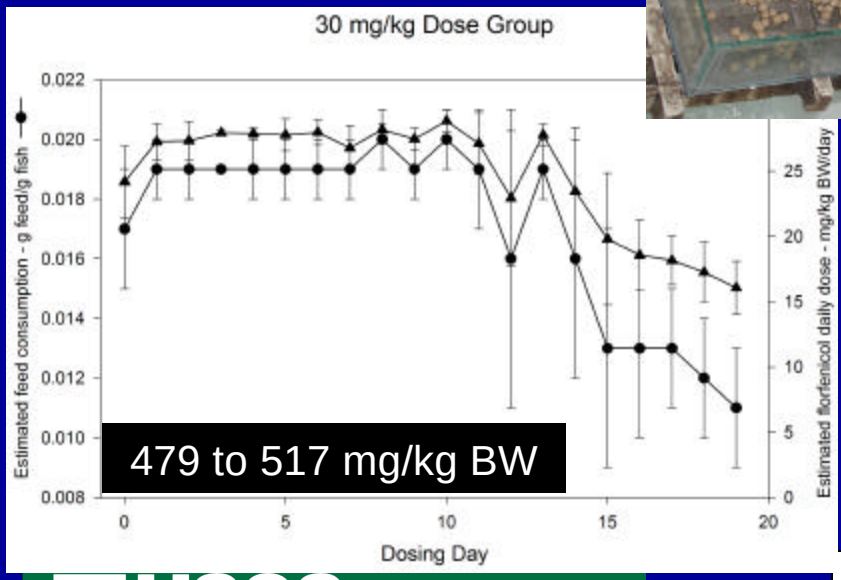

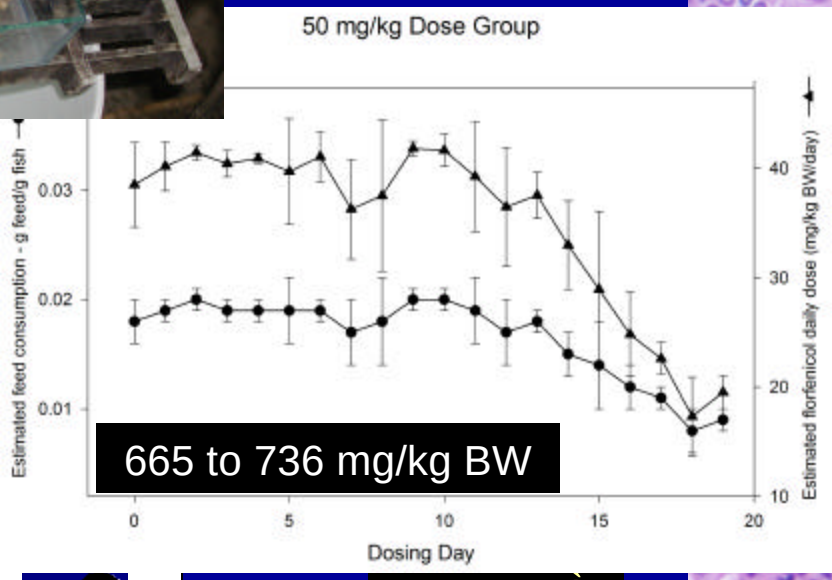

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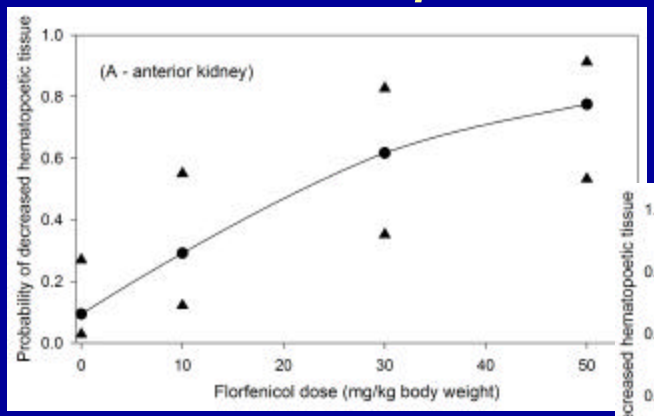
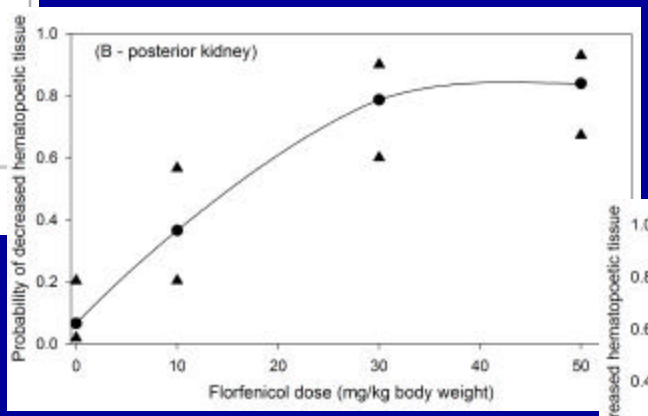
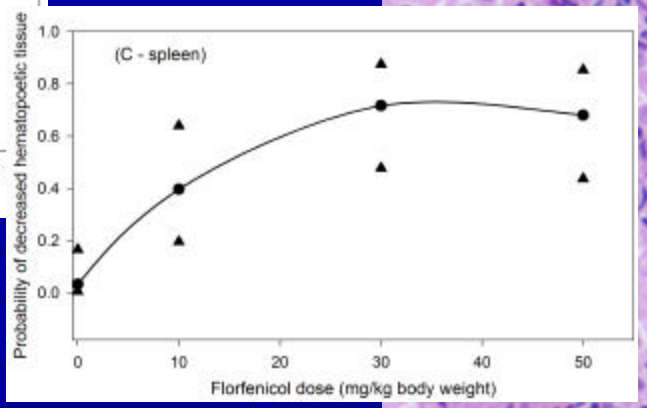
Histopathology

- *Dose-dependent, minimal to mild decrease in hematopoetic/ lymphopoetic tissue*







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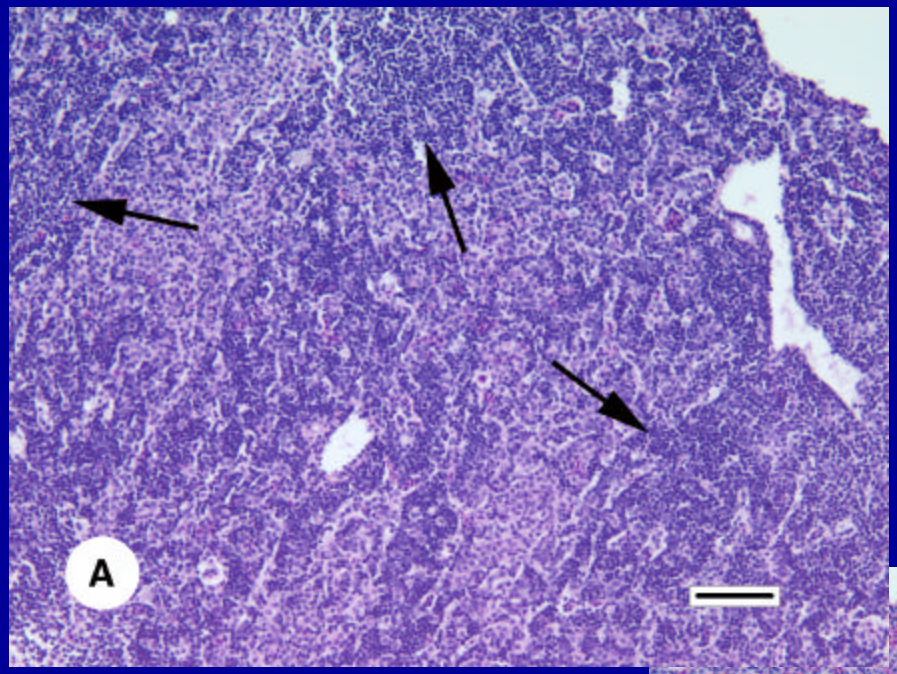

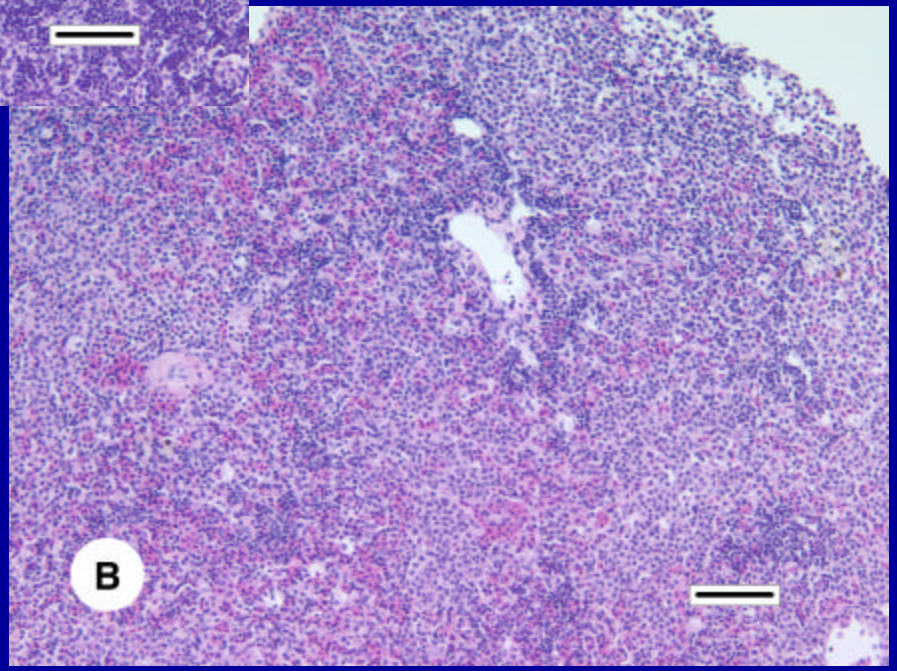

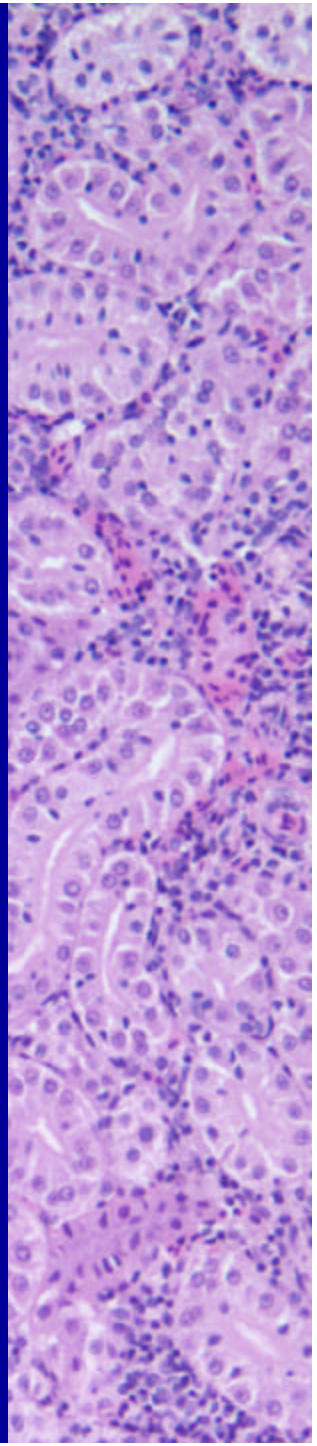

Anterior kidney

- A – control
- B – 5X group

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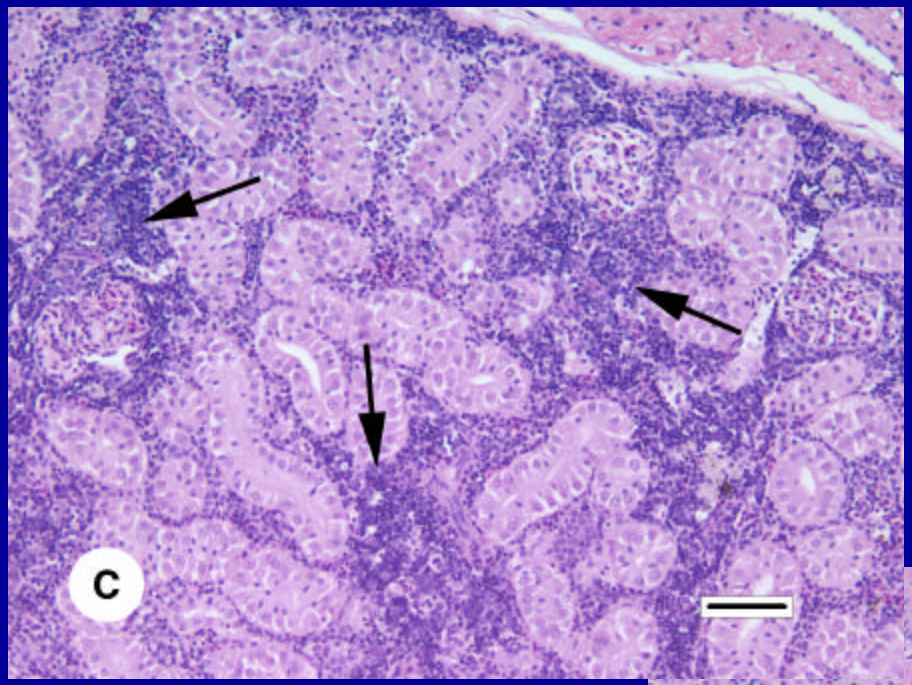

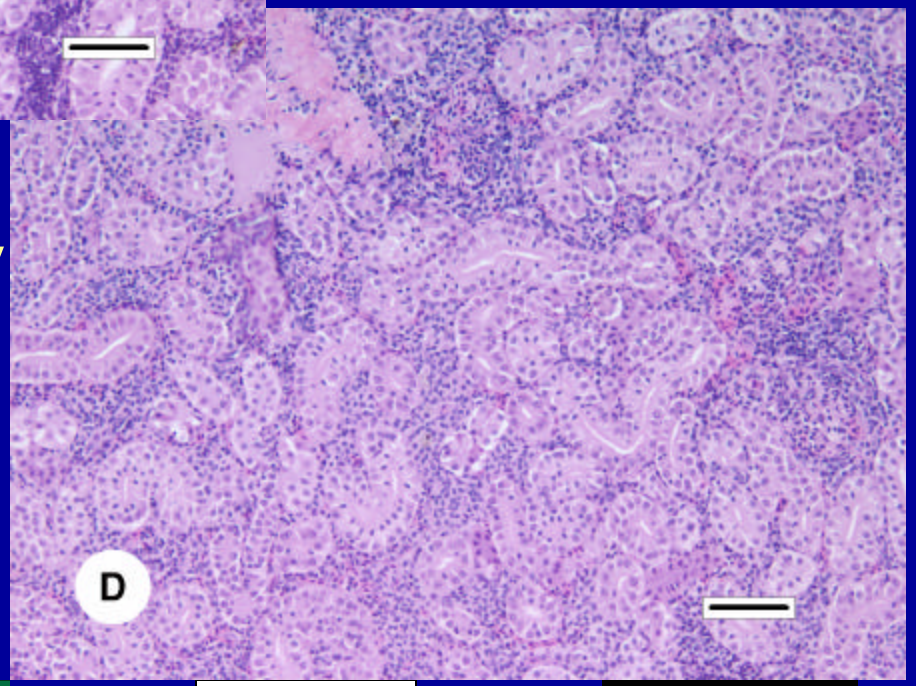

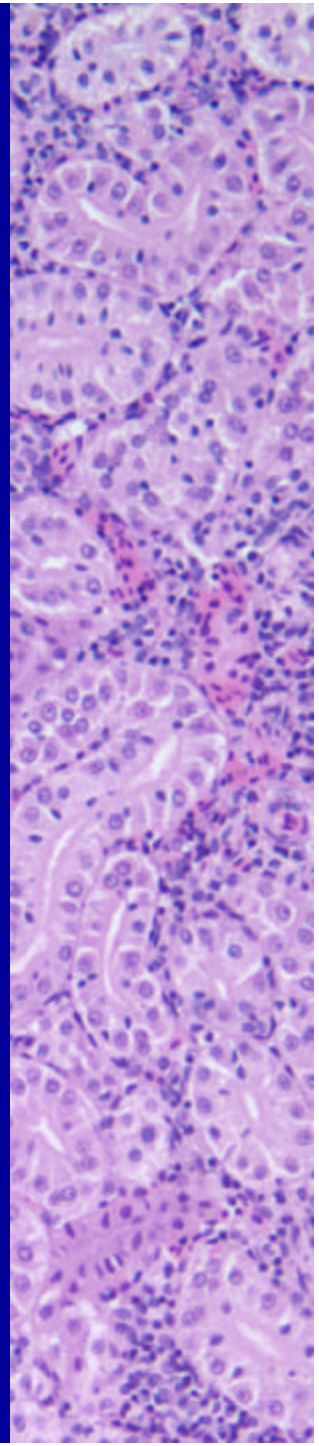

Posterior kidney

- C – control
- D – 5X group

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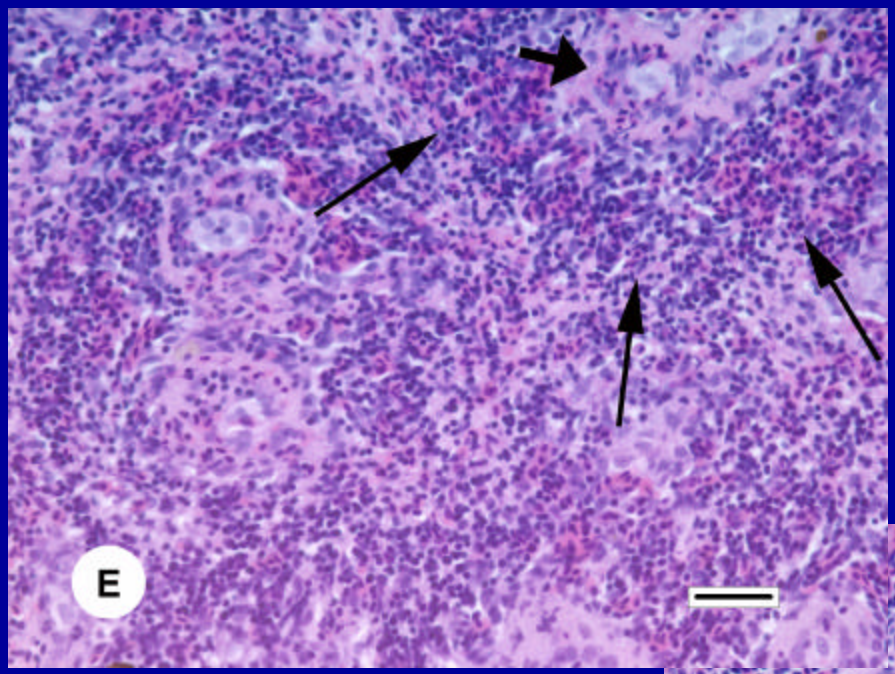

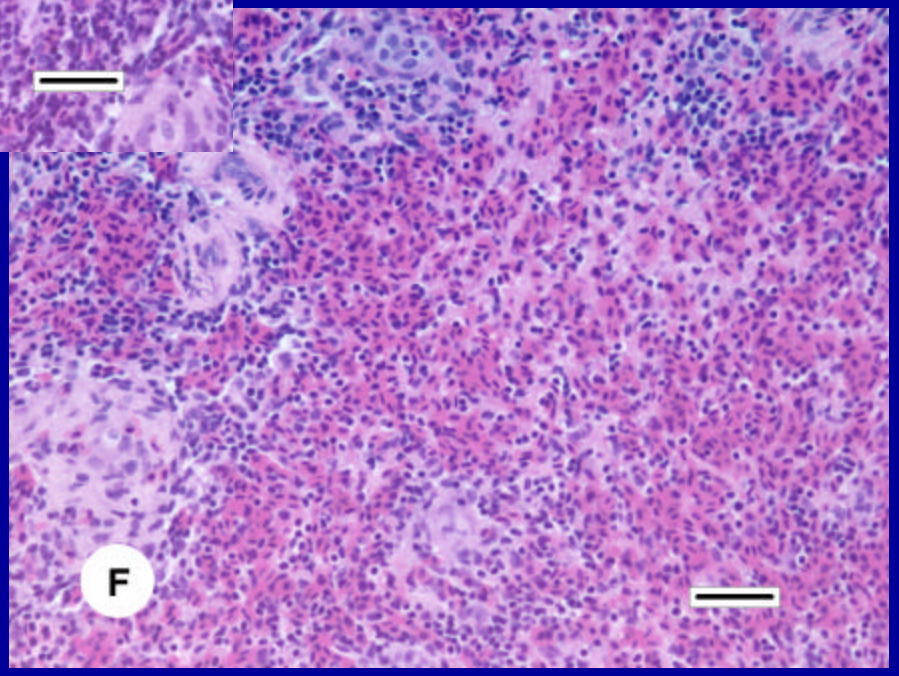

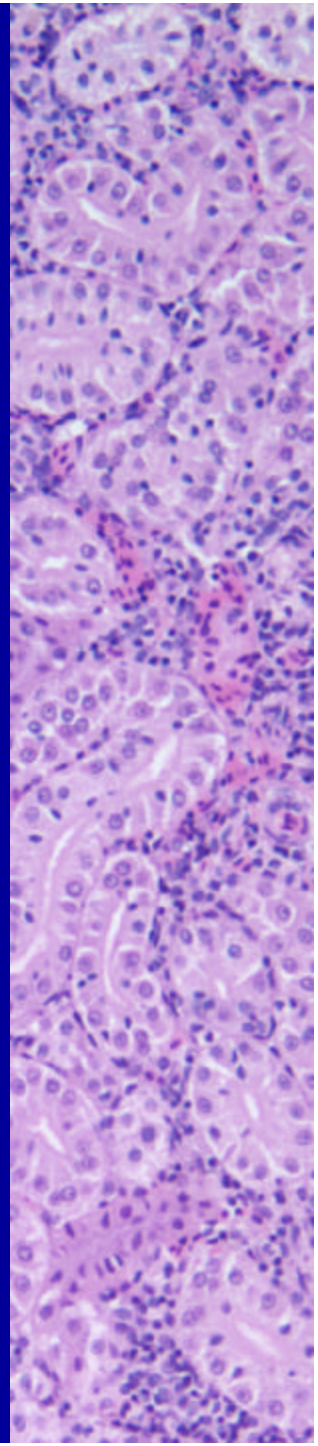

Spleen

- E – control
- F – 5X group

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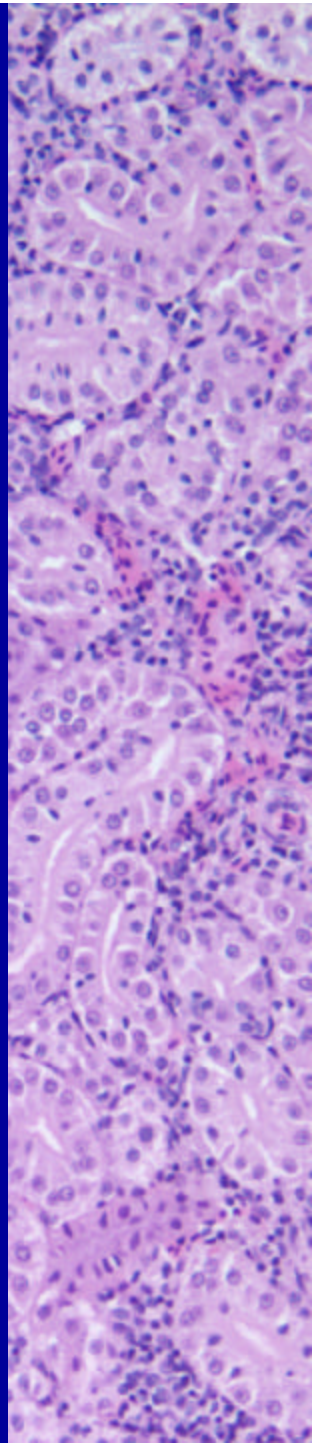
Why H&L Tissue Decline??

- *Decreased H&L tissue proliferation?*
  - *Teleost kidney elimination is relatively slow*
  - *Inhibits bacterial protein production by binding to 70S ribosome (50S subunit)*
  - *70S ribosome also in eukaryotic mitochondria*
  - *Decreased pathogen load reduces the need for H&L tissue – germ-free vs. SPF rodents*
- *Increased H&L tissue destruction?*
  - *No karyorrhexis, pyknosis, or cellular debris*
  - *No cytoplasmic vacuolation or toxic basophilia*



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Conclusions

- *Channel catfish dosed with Aquaflor® at the recommended therapy, 10 mg/kg BW/d for 10 d, will not have dose-related changes in behavior, feed consumption, or growth.*
- *Aquaflor® therapy may induce a minimal to mild decrease in H&L tissue. Decreased H&L tissue may be transient in nature.*